

Claims:

1. Device for recording of three-dimensional image data of an object, comprising the following:

- recording means (5) for recording of the light emerging from the object (1); and
- lens means (4, 17, 20) with a plurality of cylinder lenses (8, 9, 18a, 18b, 19a, 19b, 21a, 21b, 22a, 22b) which form lens elements (10) through which the light emerging from the object (1) can be imaged onto the recording means (6), by at least the first of the lens elements (10) an image of the object (1) or of parts of the object (1) which are to be recorded being able to be produced at a first location on the recording means (5), this image differing from the image of the object (1) or of parts of the object (1) which are to be recorded, which can be produced by at least the second of the lens elements (10) at a second location which is different from the first,

characterized in that the curvature of the cylinder lenses (8, 9, 18a, 18b, 19a, 19b, 21a, 21b, 22a, 22b) in the edge areas of the lens means (4, 17, 20) is made greater or lesser than in the middle area of the lens means (4, 17, 20).

2. Device for recording of image data as claimed in claim 1 or as claimed in the preamble of claim 1, wherein between the individual cylinder lenses (8, 9, 18a, 18b, 19a, 19b, 21a, 21b, 22a, 22b) grooves (11, 12) are made which extend parallel to the cylinder axes of the cylinder lenses (8, 9, 18a, 18b, 19a, 19b, 21a, 21b, 22a, 22b).

3. Device for recording of image data as claimed in one of claims 1 or 2, wherein the cylinder lenses (8, 9, 18a, 18b, 19a, 19b, 21a, 21b, 22a, 22b) have a spherical and/or an aspherical

curvature.

4. Device for recording of image data as claimed in one of claims 1 to 3, wherein the lens means (4, 17, 20) have a first array of cylinder lenses (8, 18a, 18b, 21a, 21b) and a second array of cylinder lenses (9, 19a, 19b, 22a, 22b), the cylinder lenses (8, 18a, 18b, 21a, 21b) of the first array being aligned essentially perpendicular to the cylinder lenses (9, 19a, 19b, 22a, 22b) of the second array.

5. Device for recording of image data as claimed in claim 4, wherein the first array of cylinder lenses (8, 18a, 18b, 21a, 21b) is made on the entry surface (6) of the lens means (4, 17, 20) which can be turned toward the object (1), and wherein the second array of cylinder lenses (9, 19a, 19b, 22a, 22b) is made on the exit surface (7) of the lens means (4, 17, 20) which can be turned away from the object (1).

6. Device for recording of image data as claimed in claim 5, wherein each and every one of the lens elements (10) is formed by a cylinder lens (8, 18a, 18b, 21a, 21b) on the entry surface (6) and a cylinder lens (9, 19a, 19b, 22a, 22b) on the exit surface (7).

7. Device for recording of image data as claimed in one of claims 1 to 6, wherein the distance between the recording means (5) and the lens means (4, 17, 20) corresponds roughly to the focal length of the lens elements (10).

8. Device for recording of image data as claimed in one of claims 1 to 7, wherein the distance between the recording means (5) and the lens means (4, 17, 20) can be changed.

9. Device for recording of image data as claimed in one of claims 1 to 8, wherein the recording means (5) comprise a part of a printing device on which changes can be achieved by the incident image data such that selective toner application is enabled according to the image data.

10. Device for recording of image data as claimed in one of claims 1 to 9, wherein the recording means (5) comprise at least one sensor element which can be read out digitally and/or electronically, especially at least one CCD chip (13) or an array of CCD chips (13).

11. Device for recording of image data as claimed in one of claims 1 to 10, wherein the recording means (5) can record the light which has been imaged by one of the imaging elements separately from the light which is imaged by the other of the imaging elements.

12. Device for recording of image data as claimed in one of claims 1 to 11, wherein the device comprises read-out means and/or processing means which can process and/or read out the image data of the object (1) which have been recorded by the recording means (5).

13. Device for recording of image data as claimed in one of claims 1 to 12, wherein the three-dimensional image data are data about static images for example in the form of photo data or are image data about moving images, for example in the form of video data.

14. Device for reproduction of three-dimensional image data of an object, comprising the following:

- reproduction means (14) for reproducing image data of the object (1); and
- lens means (15) with a plurality of lens elements which can image the light proceeding from the reproduction means (14),

wherein the reproduction means (14) can reproduce the image data which have been recorded with a device for recording of image data as claimed in one of claims 1 to 13.

15. Device for reproduction of image data as claimed in claim 14, wherein the lens means (15) like the lens means (4, 17, 20) of the device for recording of image data are made as claimed in one of claims 1 to 13.

16. Device for reproduction of image data as claimed in one of claims 14 or 15, wherein the lens means (15) correspond to the lens means (4, 17, 20) of the device for recording of image data as claimed in one of claims 1 to 13, but are made larger or smaller than them.

17. Device for reproduction of image data as claimed in one of claims 15 to 16, wherein the reproduction means (14) are made as passive reproduction means, especially as a printout or the like.

18. Device for reproduction of image data as claimed in one of claims 14 to 17, wherein the reproduction means (14) are made as active reproduction means, especially as a screen or display in the form of a cathode ray screen or liquid crystal display or as an optical image output device, for example as a beamer or laser television or the like.

19. Device for reproduction of image data as claimed in one of claims 14 to 18, wherein the image data are data about static images, for example in the form of photo data, or are data about moving images, for example in the form of video data.

20. Process for recording and reproduction of three-dimensional image data of an object, characterized by the following process steps:

- image data of an object (1) are recorded by means of a device for recording of image data as claimed in one of claims 1 to 13;
- the recorded image data are reproduced by means of a device for reproduction of image data as claimed in one of claims 14 to 19.

21. Process as claimed in claim 20, wherein after recording and before reproduction of the image data they are processed, especially digitally processed.

22. Microscope for recording and reproduction of three-dimensional image data of an

object, wherein the image data can be recorded with a device for recording of image data as claimed in one of claims 1 to 13 and can be reproduced with a device for reproduction of image data as claimed in one of claims 14 to 19.

23. Video device for recording and reproduction of three-dimensional image data of an object, wherein the image data can be recorded with a device for recording of image data as claimed in one of claims 1 to 13 and can be reproduced with a device for reproduction of image data as claimed in one of claims 14 to 19.

24. Photo device for recording and reproduction of three-dimensional image data, wherein the image data can be recorded with a device for recording of image data as claimed in one of claims 1 to 13 and can be reproduced with a device for reproduction of image data as claimed in one of claims 14 to 19.